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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Igor Lubomirsky

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EXAMINER

NGUYEN, KHANH TUAN

ART UNIT

PAPER NUMBER

1766

MAIL DATE

DELIVERY MODE

05/06/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/560,107	Applicant(s) LUBOMIRSKY, IGOR	
	Examiner KHANH T. NGUYEN	Art Unit 1766	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on rce filed on 04/29/2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20, 24, 27-35, and 39-46 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,6,9,12,39 and 40 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7,8,10,11,13-20,24,27-35 and 41-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/29/2011 has been entered.

Response to Amendment

2. The amendment filed on 04/26/2011 is entered and acknowledged by the Examiner. Claims 1-20, 24, 27, 29-35, 39, 41-43 have been amended. Claims 44-46 are added. Claims 21-23, 25, 26, and 36-38 are cancelled. Claims 2, 3, 6, 9, 12, 39, 40 were previously withdrawn from further consideration. Claims 1, 4, 5, 7, 8, 10, 11, 13-20, 24, 27-35, and 41-46 are currently pending in the instant application.

3. The rejection of claims 1, 4, 5, 7-20, 24-30 and 41-43 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. Pat. 4,342,648 (MacKenzie) is rendered moot in view of the above amendment.

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4. The rejection of claims 31-35 under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. 4,342,648 (MacKenzie) is rendered moot in view of the above amendment.

5. Applicant's arguments with respect to the claims above have been considered but are moot in view of the new ground(s) of rejection.

6. The Declaration under 37 U.F.C. 1.132 filed on 04/26/2011 is acknowledged by the Examiner. The Declaration is rendered moot in view of the above amendment.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. **Claims 1, 4, 5, 7, 8, 10, 11, 13-20, 24, 27-35, and 41-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. 5,572,052 (hereinafter "Kashihara") as evidence by U.S. Pat. 5,504,330 (hereinafter "Summerfelt").**

Note that the Summerfelt reference was cited in the IDS filed on 03/28/2006.

The Examiner noted that the phrase "mechanical strain" is exemplify as electric field and temperature gradient to prevent crystallization of the amorphous compound and form a macroscopic dipole moment (See page 8 lines 13-26 of the present specification).

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Regarding claims 1, 4, 5, 7, 8, 10, 11, 13-20, 24, 27-35, and 41-43, Kashihara discloses an electronic device such as piezoelectric, pyroelectric and optoelectric devices, e.g. infrared (IR) sensors and DRAMs, using ferroelectric ceramic materials (See Col. 1, lines 10-22). Kashihara discloses a step of sputtering a material such as strontium titanate (SrTiO_3), barium titanate (BaTiO_3), or barium strontium titanate ($\text{Ba}_y\text{Sr}_{1-y}\text{TiO}_3$) onto a silicon substrate and then annealing at temperature of 500-700°C to form a perovskite type crystal structure film that includes the amorphous morphology, e.g. an amorphous SrTiO_3 layer (See Col. 11, lines 25-49). Kashihara discloses a step of gradient heating, i.e. drying at 100-200°C for 10 min., pre-sintering at 300-500°C for 30 min., and sintering at 500-700°C for 30 min. (See FIG. 11). The Examiner notes that Applicant described a method of preparing the quasi-amorphous BaTiO_3 by sputtering a BaTiO_3 layer onto a Si wafer (silicon substrate) and follow by isothermal heating at 600-800°C (See page 10 line 25 to page 11 line 7; page 14 lines 24-27; and page 15 lines 2-3 of the present specification). Kashihara discloses a device containing the same ingredient as claimed, i.e. BaTiO_3 , and a similar method of preparing the BaTiO_3 film, i.e. sputter follow by heating. The step of heating the sputtered Si substrate at 500-700°C is a mechanical strain that would prevent

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crystallization of the amorphous compound and form a macroscopic dipole moment (See page 8 lines 13-26 of the present specification).

The difference between the present application and Kashihara is that Kashihara does not expressly disclose the sputtering a material, e.g. strontium titanate (SrTiO_3), barium titanate (BaTiO_3), or barium strontium titanate ($\text{Ba}_y\text{Sr}_{1-y}\text{TiO}_3$), having piezoelectric properties as recited in the instant claims.

Summerfelt discloses a lead substituted perovskite, e.g. lead substituted SrTiO_3 (See Col. 6, lines 37-40), compound for thin film pyroelectric devices, e.g. DRAM (See Col. 1, line 29 and Col. 7, lines 22-34). Summerfelt discloses that the perovskite material exhibit piezoelectric (See Col. 7, lines 23-24). Summerfelt discloses that the lead substituted SrTiO_3 is a pyroelectric material (See Col. 3, lines 41-43 and Col. 6, lines 37-40). Summerfelt discloses that the perovskite material having ferroelectric property has a polarization direction that may be switch by electric field (See Col. 1, lines 45-50). As acknowledged by the Applicant at page 2, first paragraph, of the Declaration:

"The basic difference between pyroelectric materials and ferroelectric materials is that in ferroelectric materials, the direction of the polarization is reversed as the

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applied electric field is reversed, **while pyroelectric materials do not possess polarization reversal.**" (Emphasis Added).

Clearly, it is known that pyroelectric materials do not possess polarization reversal by application of electric field. Thus, the sputter material, e.g. strontium titanate (SrTiO_3), of Kashihara as evidence by Summerfelt is a pyroelectric material that does not possess polarization reversal by application of electric field. The pyroelectric material of Kashihara is expected to have a pyroelectric vector whose direction cannot be changed or reversed as claimed. Thus, the sputter material of Kashihara fulfills the claimed quasi-amorphous pyroelectric compound that is coated onto a substrate of a device as required in the instant claims.

Regarding claims 44-46, Kashihara discloses a device wherein a pyroelectric material layer (sub-insulating layer 32) is sandwiched between an upper electrode 34, main insulating layer 33 and a lower electrode 31 (See FIG. 9; Col. 14, lines 38-48), thereby clamping the pyroelectric material layer by the substrate (31, 33, and 34), such that volume expansion of the pyroelectric material layer is restricted.

In view of the foregoing, the above claims have failed to patentably distinguish over the applied art.

Other Prior Art Cited

9. The prior art made of record and not relied upon is considered pertinent to the applicant's disclosure.

U.S. Pat. 3,604,933 discloses a pyroelectric material having the capacity for a spontaneous polarization, i.e. a polarization which, once induced, remains in the absence of either an applied electrical field or an external stress (See Col. 1, lines 67-72).

U.S. Pat. 3,999,069 discloses a pyroelectric material, e.g. lanthanum modified lead zirconate titanate, can be poled by heating above a particular temperature where the dipoles of the pyroelectric material orient themselves in accordance with an applied electric field and the dipoles will remain as oriented when the electric field is removed (See Col. 3, lines 20-31 and Col. 3, lines 42-45).

Conclusion

10. No claim is allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T. NGUYEN whose telephone number is (571) 272-8082. The examiner can normally be reached on M-F 9:00-6:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be

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reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Khanh Tuan Nguyen/
Examiner, Art Unit 1766